

# Claims

[c1] What is claimed is:

1.A projection display device, comprising:  
a casing;  
an optical engine, installed in said casing, and comprising a lamp; and  
a lamp cooling apparatus, installed in said casing, and comprising a fan and recess, said fan being installed at the bottom part of said lamp and said recess being disposed below said fan.

[c2] 2.The device according to claim 1, wherein said recess of said lamp cooling apparatus is disposed on said casing.

[c3] 3.The device according to claim 1, wherein said projection display device further comprises an air inlet and air outlet, and said air inlet and said air outlet are respectively disposed at opposite flank sides of said casing.

[c4] 4.The device according to claim 1, wherein said lamp cooling apparatus further comprises a lamp cover, said lamp cover is installed outside of said lamp, and a convection space is formed between said lamp cover and said lamp.

- [c5] 5.The device according to claim 4, wherein an air inlet and an air outlet are respectively disposed at the places on said lamp cover relative to the bottom and the top of said lamp.
- [c6] 6.The device according to claim 5, wherein said fan is installed at said air inlet.
- [c7] 7.The device according to claim 5, wherein diversion plates are installed at said air outlet.
- [c8] 8.A lamp cooling apparatus, comprising:  
a fan, installed at the bottom part of said lamp; and  
a recess, disposed below said fan.
- [c9] 9.The apparatus according to claim 8, further comprising a lamp cover, installed outside of said lamp, a convection space is formed between said lamp cover and said lamp.
- [c10] 10.The apparatus according to claim 9, wherein a air inlet and air outlet are respectively disposed at the places on said lamp cover relative to the top and the bottom of said lamp.
- [c11] 11.The apparatus according to claim 10, wherein said fan is installed at said air inlet.
- [c12] 12.The apparatus according to claim 10, wherein diver-

sion plates are installed at said air outlet.